



The role of EERI in NEHRP post-earthquake investigations

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ACEHR Meeting – March 26, 2020

About EERI



Established in 1948, EERI is the leading non-profit membership organization that connects multidisciplinary professionals dedicated to reducing earthquake risk.



engineers,
geoscientists,
social scientists,
architects,
planners,
emergency
managers,
academics,
students, and
many other like-
minded
professionals

EERI Mission

EERI will **reduce earthquake risk** by:

- Advancing the science and practice of earthquake engineering,
- Improving understanding of the impact of earthquakes on the physical, social, economic, political, and cultural environment, and
- Advocating comprehensive and realistic measures for reducing the harmful effects of earthquakes.



Learning from Earthquakes (LFE)

- Flagship program of EERI
- Conducting earthquake reconnaissance since 1948
- LFE program formalized in 1973 with NSF funding
- Multidisciplinary focus
- Academics + practitioners



Reconnaissance 1955

Learningfromearthquakes.org

LFE Mission

The mission of the Learning from Earthquakes (LFE) Program is to accelerate and increase learning from earthquake-induced disasters that affect the natural, built, social and political environments worldwide.

Leadership: LFE Executive Committee



Charlie Huyck,
Chair



Judy Mitrani-Reiser,
Board Liaison



Erica Fischer,
VERT Co-Chair



Manny Hakhamaneshi,
VERT Co-Chair



Mike Mieler,
Business Resilience
Co-Chair



Yu Xiao,
Business Resilience
Co-Chair



Thalia Anagnos,
Travel Study Chair



Ken Elwood



Craig Davis



David Friedman



David Frost



Jeff Hunt

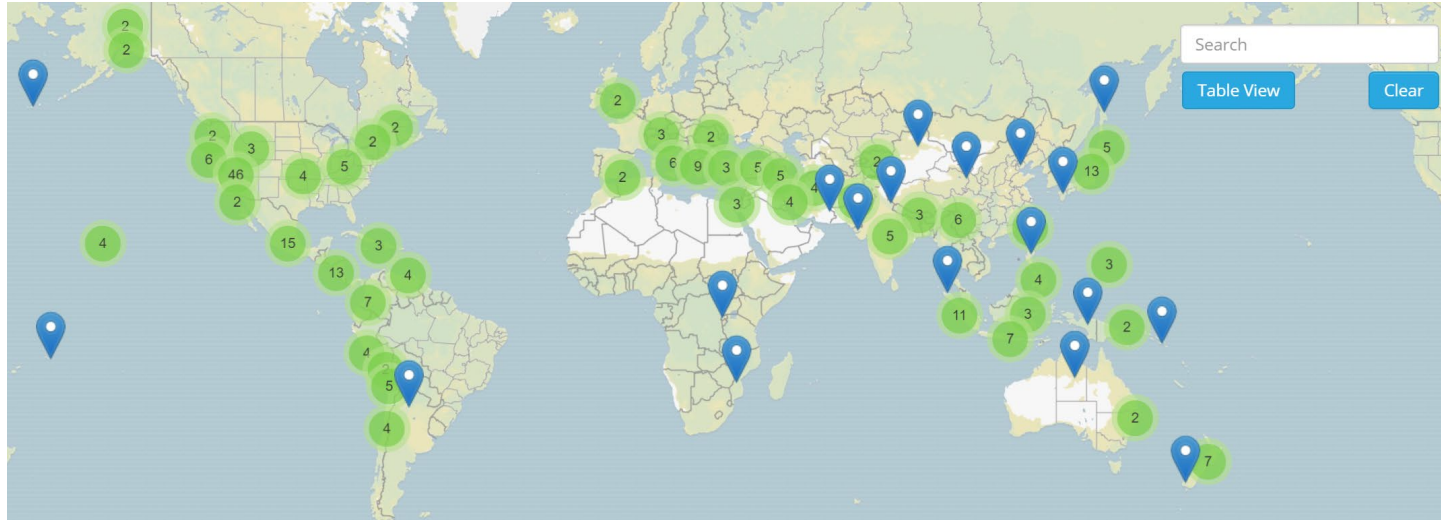


Laurie Johnson



Rob Olshansky

LFE Earthquake Responses



More than 300 Earthquakes and 50 Countries

EERI Roles in Circular 1242

- Phase I:
 - Following this incident report, the USGS shall convene with FEMA, NIST, NSF, the state geological survey(s), and the Earthquake Engineering Research Institute (EERI) to **determine if the earthquake is significant and warrants implementation** of either all or part of the NEHRP post-earthquake coordination plan.
 - EERI shall have principal responsibility for **collating and linking to engineering information** as provided by engineering centers, institutions, and private practice.
 - Within 24 hours following mutual consultation, the USGS, FEMA, and EERI will work with state agencies to **organize a field technical clearinghouse**.
- Phase III:
 - An **event summary report** for a broad audience shall be published within 3 months of the event. The report shall integrate preliminary observations on the response of the natural, built, and socioeconomic environments. It shall be prepared by the USGS and EERI in collaboration with other NEHRP supported investigators and institutions.
- Foreign Earthquakes:
 - for foreign earthquakes, which typically are less intensively investigated than domestic earthquakes, the plan recommends that all U.S. **post-earthquake investigators inform EERI of plans and schedules** of investigations before departure, as well as their ongoing status once in the field. **EERI shall regularly report** these planned activities and their status to the NEHRP agencies as well as on its Web site.

LFE Activities in support of Circular 1242

- Physical clearinghouse operations
- Virtual clearinghouse websites
- Briefings and team coordination
- Webinars
- Reports and publications
- Research Needs Workshops/1-year meetings

Other LFE Reconnaissance Activities:

- EERI LFE Reconnaissance team deployment, often with participation of NEHRP Agency representatives
- Virtual Earthquake Reconnaissance Team (VERT)
- California Earthquake Clearinghouse Vice Chair

LFE Beyond Reconnaissance Deployment

Reconnaissance, but also:

- Training programs
 - LFE Travel Study Program
 - Regional Reconnaissance Training Workshops
- Tool development and testing
- Reconnaissance research and development
 - Resilience Observatory: framework, business survey, public health work (in development)
 - Reconnaissance field guide and data collection forms
- *Earthquake Spectra* papers



2019 LFE Travel Study Trip Participants in New Zealand

Current LFE Funding Mechanisms

- **FEMA Cooperative Agreement**
 - Clearinghouse preparedness (began FY 2016)
 - Clearinghouse briefing webinars
 - Clearinghouse reconnaissance reports
 - Clearinghouse activations (upon approval)
- **USGS External Grants**
 - 1-year anniversary meetings
 - Special Issues of *Earthquake Spectra*
- **NSF Grants**
 - 1-year anniversary meetings
- **EERI Operational Funds**
 - Expenses not covered by Federal funding
 - International earthquake response
- **LFE Endowment – *In Progress***
 - Current fundraising effort to provide sustainable funding for various aspects of the program

EERI Response to Recent U.S. Earthquakes

Recent U.S. Earthquakes

- 2020 Utah Earthquake
- 2020 Puerto Rico Earthquakes
- 2019 Ridgecrest Earthquakes
- 2018 Anchorage, Alaska

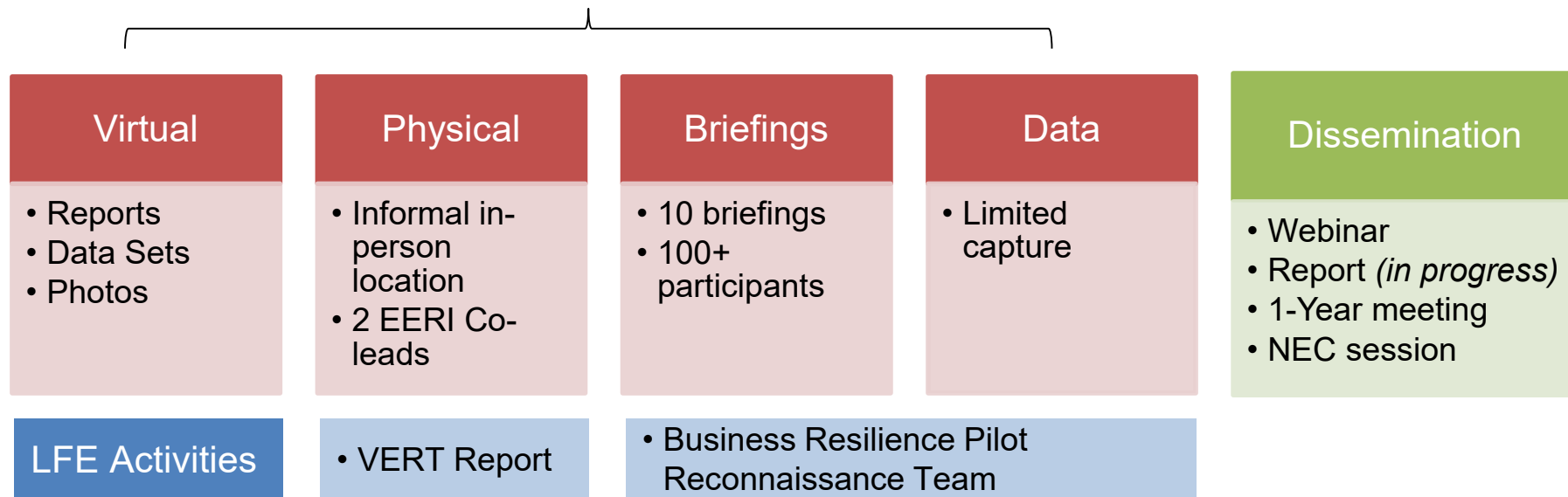


Ridgecrest Earthquake Sequence Physical Clearinghouse July
2019

Photo: Maria Luisa Jiminian, EERI

2018 Anchorage, AK Earthquake

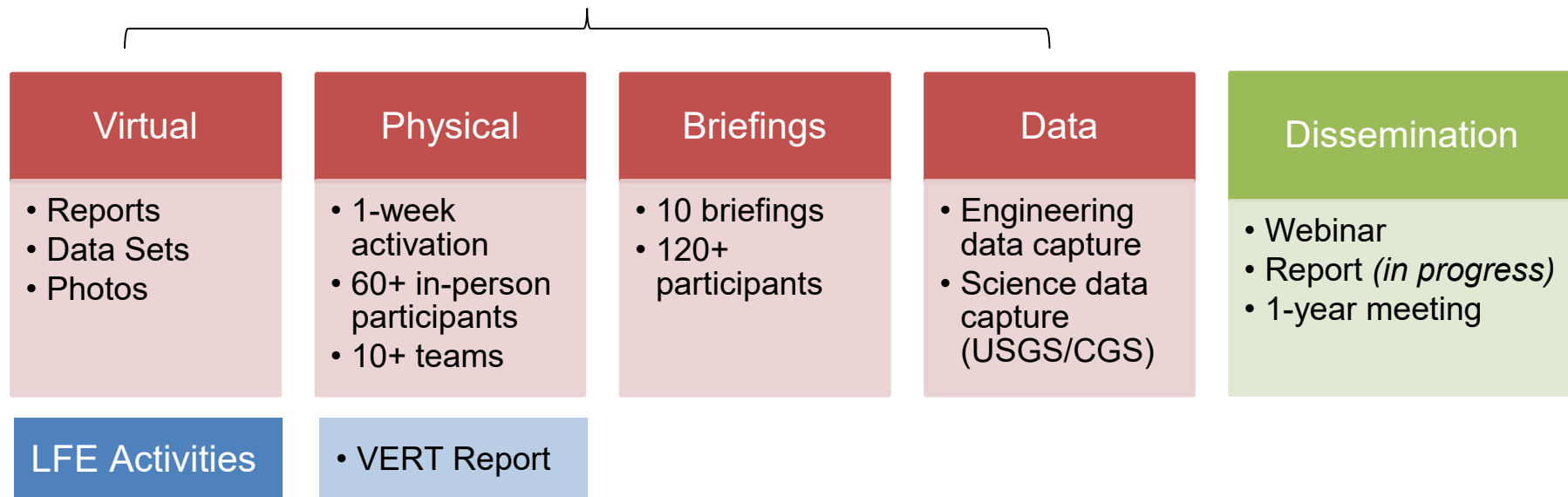
Technical Clearinghouse



<http://www.learningfromearthquakes.org/2018-11-30-anchorage-alaska/>

2019 Ridgecrest Earthquake Sequence

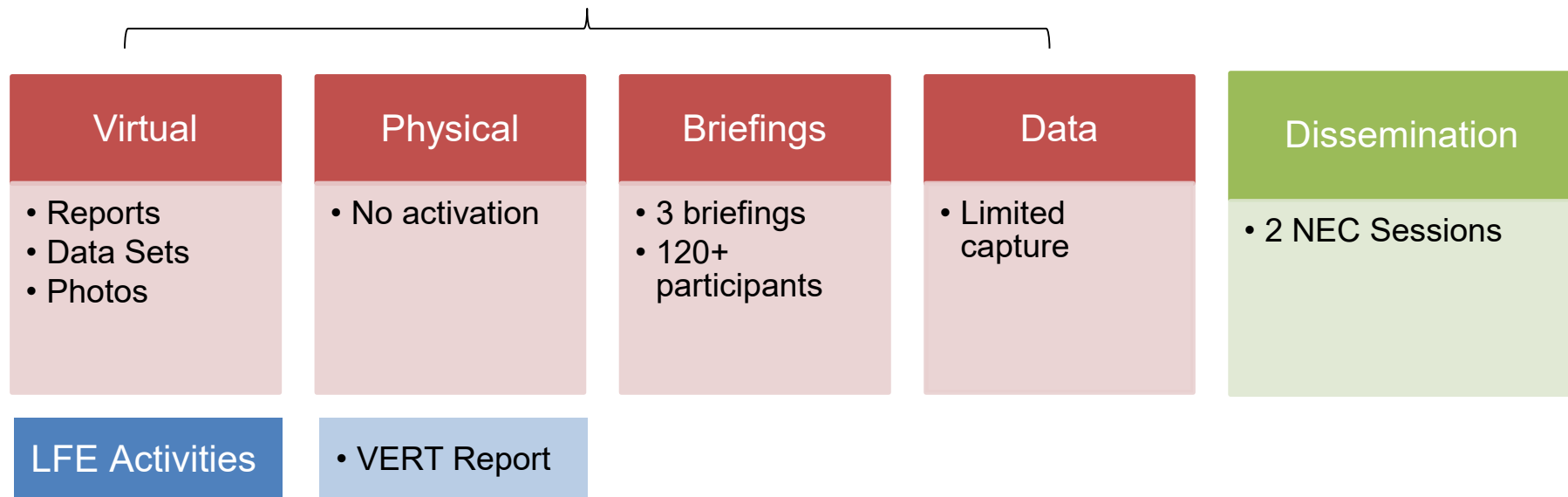
Technical Clearinghouse



<http://learningfromearthquakes.org/2019-07-04-searles-valley/>

2020 Puerto Rico Earthquake Sequence

Technical Clearinghouse

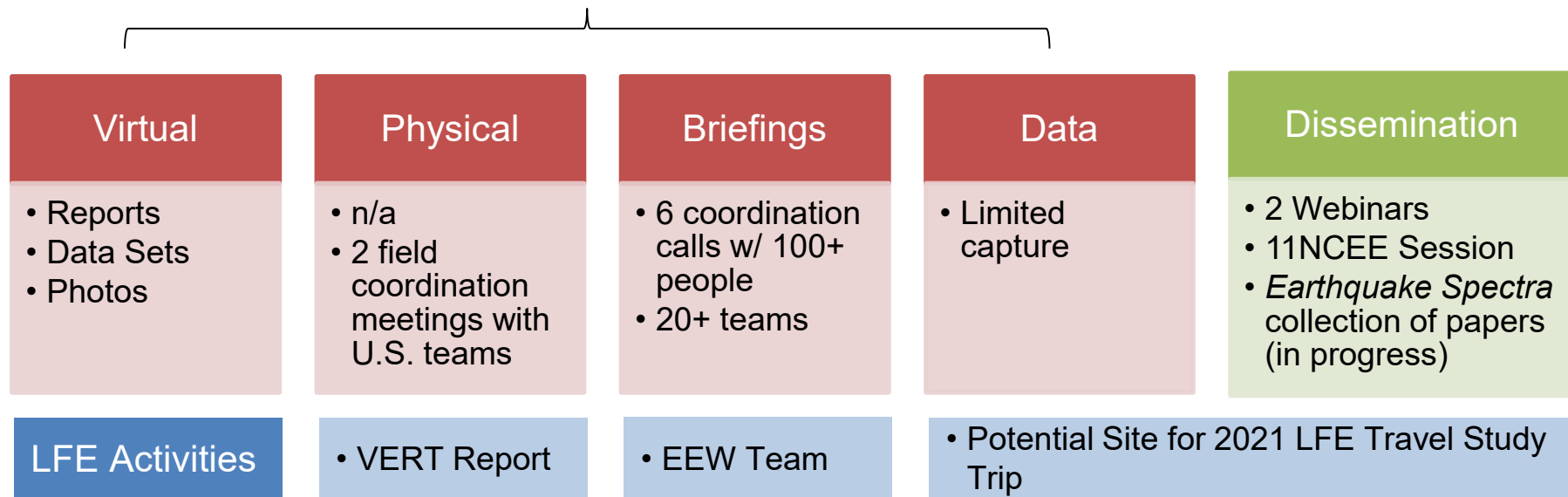


<http://www.learningfromearthquakes.org/2020-01-07-puerto-rico/>

EERI Response to International Earthquakes

2017 Puebla-Morelos, Mexico Earthquake

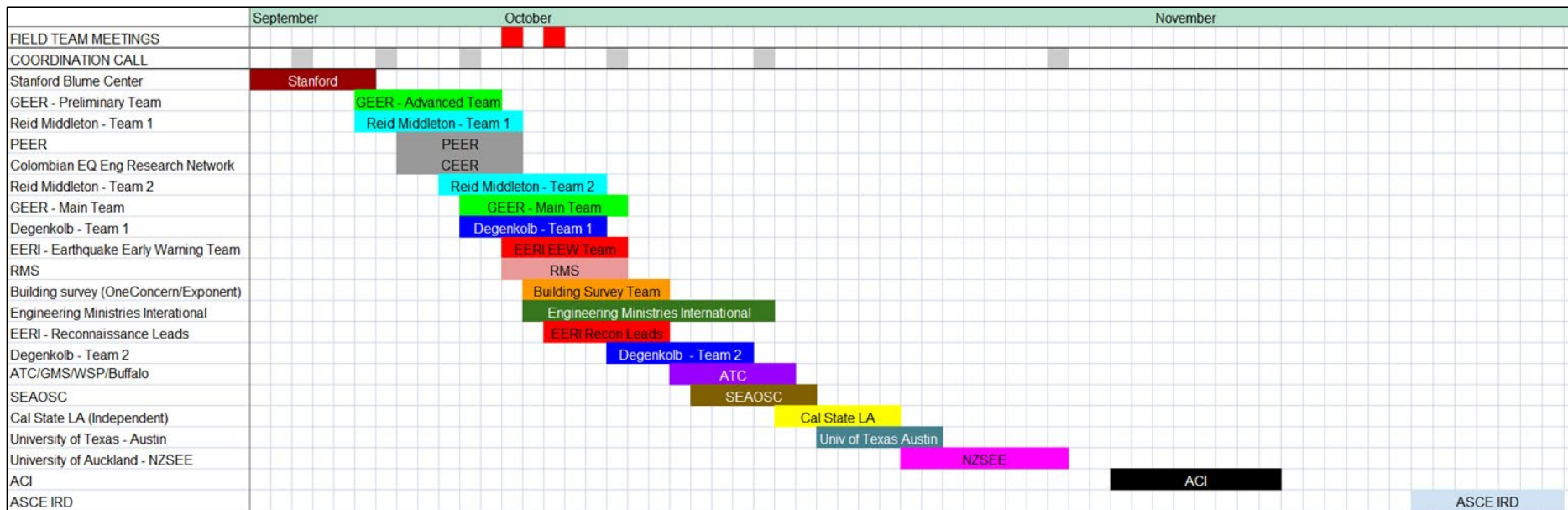
Technical Clearinghouse



<http://learningfromearthquakes.org/2017-09-19-puebla-mexico/>

M7.1 September 2017 Mexico Earthquake

Reconnaissance Teams Responding to the 2017 Puebla-Morelos, Mexico Earthquake:



EERI Successes in support of NEHRP

- Effective “Phase I” response to recent U.S. earthquakes that complements and supports agency actions with advantages of speed and flexibility
- Successful one-year events for Alaska and Ridgecrest
- High participation and interest in clearinghouse briefing calls demonstrate need and usefulness
- Well attended briefing webinars

EERI Challenges & Opportunities

- Communication with state and local agencies
- Sustaining staff availability after initial Phase I response
 - Developing collaborative report
 - Capturing and archiving data
 - Continuing to compile new reports and publication on virtual clearinghouse
 - Supplemental funding for these types of tasks is needed
- Build on recent activations to improve scalability of response to larger, urban centers

Future Needs and Opportunities for NEHRP Post-Earthquake Investigations

Notes from Listening Session at the 2020 National Earthquake Conference are another great resource for ideas and have been provided by EERI to USGS



Future NEHRP Needs and Opportunities

1. Documenting and sharing lessons after earthquakes across many technical disciplines is critical to the nation's future preparedness and resilience.
2. Sustained coordination and focus by all four agencies in support of post-earthquake investigations and related activities remains essential
3. Partnerships with non-agencies enhances NEHRP's agility and impact

Future NEHRP Needs and Opportunities

4. Successful Clearinghouse deployments take significant pre-event planning, staffing during response, and post-event data compilation/processing and dissemination
 - Funding and NEHRP agency support is needed at all these phases
 - Multidisciplinary collaboration and coordination takes facilitation but has significant benefits
5. Earthquake reconnaissance participants are growing so team coordination and collaboration is critical
 - Data sharing trends are promising
6. Timeframe for post-earthquake investigations is expanding
 - Long-term investigations needed to understand recovery & resilience
 - Data will be needed over time to inform and measure functional recovery objectives